THE

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OF THE

NATIONAL ASSOCIATION of CHIROPODISTS PODIATRISTS

THE OFFICIAL PUBLICATION OF THE PROFESSION

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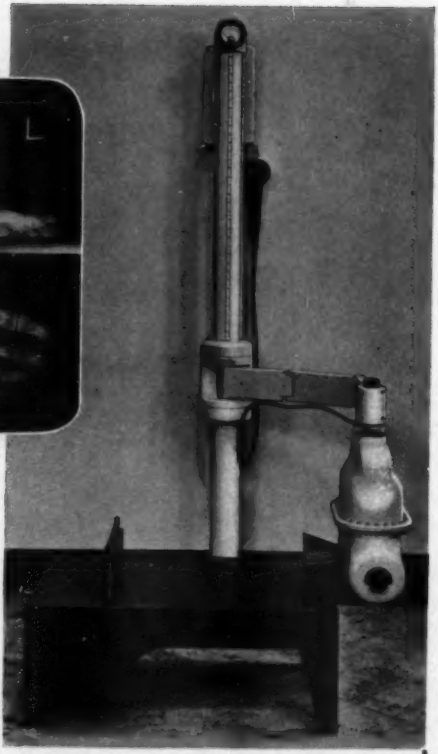

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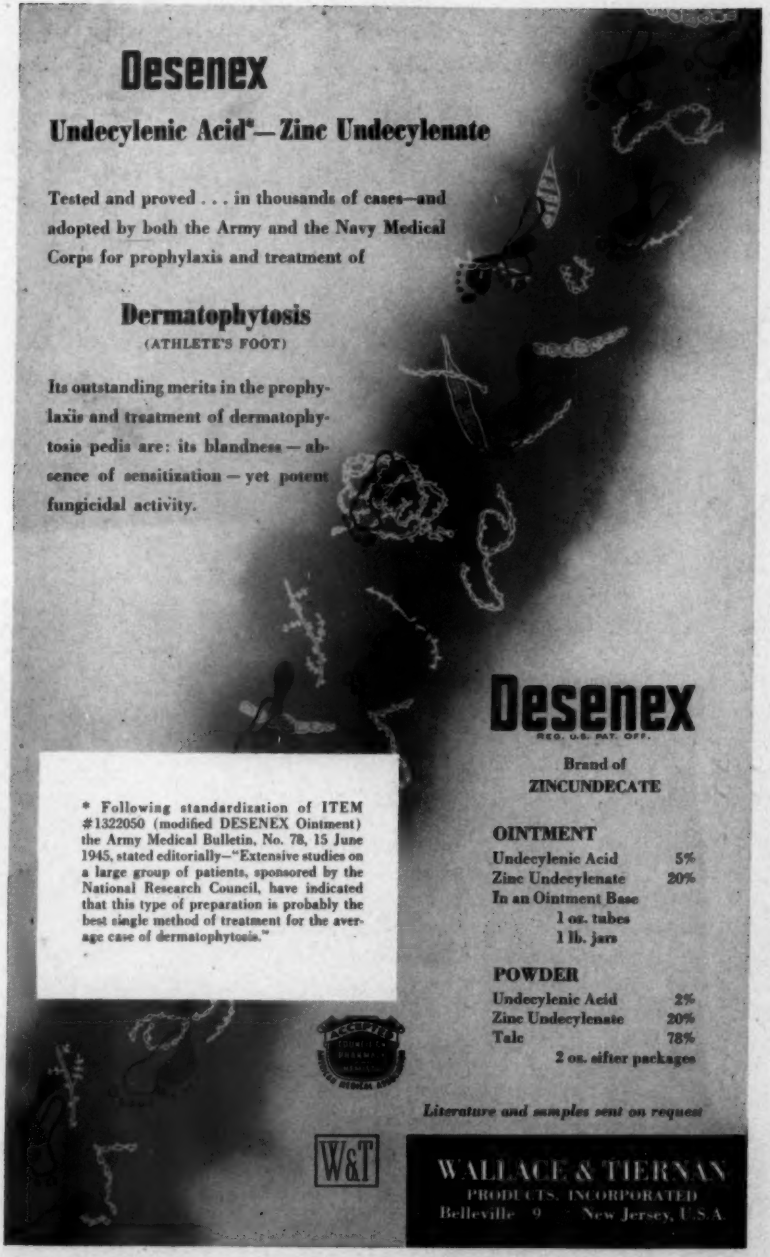

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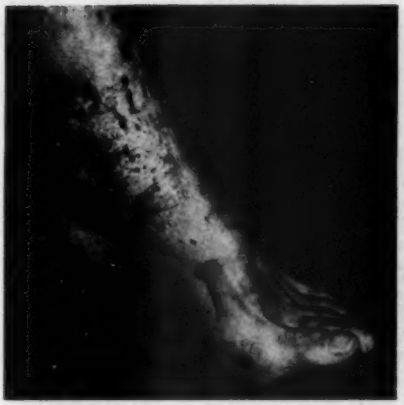

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THE EVOLUTION OF THE HUMAN FOOT

EDWIN J. KAY, D.S.C.
Silver Spring, Md.

WE FIND that the primary essentials for successful change from an aqueous habitat to life upon the land in the course of locomotion would seem to include two physical requirements: (1) the development of locomotor structures capable of competing with the force of gravity and (2) the modification of respiratory structures to permit air breathing.[1] We shall be mainly concerned with the former. In discussing the evolution of the human foot, it is apparent that an actual homology between the fins of fishes and the limbs of higher land-living vertebrates has still evaded actual demonstration, although evidence from fossil and surviving "lobe-fin" fishes unmistakenly affirms such an homology. In contrast to the delicate fin pattern of modern fishes, the lobe-fin has a stout, fleshy base, containing musculature that extends from the body, well out upon the fin structure; moreover, its base includes discrete bony segments comparable to the humerus, radius and ulna of higher forms.[2]

Moreover, we are led to believe that in the gradual transition from aquatic forms the early terrestrial groups were clumsy and sprawling in their movements on land, and rarely traveled far from their aquatic homes. The limbs extending laterally from the animal's sides, incapable of lifting the heavy body from the ground, were used for pushing, in order to assist the wriggling motions of the body by which the creature propelled itself forward. In time the legs attained proportion and strength and raised the body effectively from the ground; with locomotion assumed more and more by the limbs, longer excursions from home were made and eventually the land-living and air-breathing reptiles made their appearance.[3]

The foot of the primitive amphibian was flat and loosely jointed. Its tarsal units still retain the incompletely ossified character of its aquatic ancestry. The legs were extended so widely from the sides of the body that the feet were ineffectively placed to assume the strains of weight-bearing, and were used chiefly as a means of propelling the body over the surface of the earth. This primitive method of locomotion caused

the physiological strains and stresses to be concentrated mainly upon the outer border of the foot and explains the greater number of phalangeal bones in the lateral toes of the early tetropods. The foot was held practically on the same plane as that of the leg.

In the transition from amphibian to reptilian foot, Morton relates that there was a gradual bending at the knee and ankle and the legs had a wider straddle. With the improvement in the design of bone and muscle, there appeared a change in stride. First there was a stress on the outer border of the foot, then gradually the outer border tended to roll upward and stresses were transferred to the inner border as the body was pushed forward. As the bending of the knee progressed and the body lifted higher and higher from the ground, increased weight was thrown on the proximal segments of the foot. The laterally extended position of the thighs, however, continued to cause the stresses of locomotion to be concentrated alternately on the two balls of the foot. The result of all this is that the fibulare was thrown into strong contact with the fibula and beneath the intermedium to form a heel. As a result the outer tarsal bones were bent into a transversely arched transformation, and the straight line of the foot and ankle was broken to form the angle of the ankle joint. The transfer of joint motion to the ankle was promoted by the transverse arching of the foot, because this alteration in contour acted as a mechanical obstruction to the movement previously allowed in the mid-tarsal joint.

The next real improvement in the limb structure was acquired in the more active groups through change in the position of the thighs; from their laterally extended position, they gradually came forward parallel with the axis of the body and beneath it. The new position of the thighs brought the position of the feet into anteroposterior alignment so that the propulsion followed the longitudinal axis of the feet instead of there being pressure exerted against their borders.[4]

Schaeffer[5] says, "the most primitive tarsal pattern is dominated by a convergence of the elements, excepting those along the preaxial border, toward the fibula a condition inherited from the pelvic fin and persisting into the caudate amphibian tarsus. The important plane of flexure during locomotion was between the tarsalia and metatarsals. There is a sporadic occurrence of ossification in the amphibian tarsus, excepting the anuras, and it is considered to be genetic and not related to the habitus of the animal. On embryological evidence it is assumed that the two elongated proximal tarsal elements are the fibulare and the tibiale plus several centralia and possibly the intermedium. There is no paleontological data to support or refute this view. The position is taken that, although the calcaneum is only the fibulare, the astragalus (talus) is compound in origin, being made up of the intermedium, a centrate, and possibly the tibiale."[6]

Schaeffer further states, "In the first type of amphibian foot the functional ankle joint remained the tarsal metatarsal area unless the foot degenerated into a paddle with most of the flexion in the digits, as in the ichthyosaurs. In the second type, in all orders excepting the crocodelia, the talus and calcaneum were functionally part of the crus. In the latter, there is movement between the talus and the calcaneum and between the latter and the fibula. In every case there is a marked reduction in the number of distal tarsal elements, a modification that

occurred along with the formation of the mesotarsal joint. The cruro tarsal joint, characteristic of the third type has a terminal femoral head and knee joint permanently crooked, however, the rounded tibial facet on the talus plus the fact that the tibial articulation is on a more distal level than the fibular, permits the foot to be forwardly directed. The development of the mesotarsal and the cruro tarsal joints may be looked upon as two different ways of treating the stress in the proximo medial region of the primitive tarsus. In the case of the former, the joint is constructed to resist the stress, in the latter to eliminate it."[7]

Definite progress in the direction of mammalian life made its first appearance about the middle of the vast period known as the age of reptiles. The thorapsid reptiles had been following a conservative line of development as land-living quadrupeds and fossil evidence in the last part of the triassic period revealed changes in skeletal structures. The thorapsid tarsus evolved along several distinct lines. In such as the cynodonts and bauriamorphs the rounded tibial facet on the talus was retained and the tibial and fibular facets on the calcaneum tended to migrate completely on to the dorsal surface. This migration freed the proximal border of the calcaneum, permitting a tuber to develop. The thorapsid femur early developed a medially directed head without any accompanying twisting in the shaft, and the femur swung more and more in a plane approaching ninety degrees. The well-rounded tibial and fibular facets eliminated the torsion in the tarsus and formed a highly mobile hinge joint. The tuber calcanei developed independently in the thecodotia and the therapsida. At some stage between the thorapsids and the mammals the talus became superimposed upon the calcaneum. This alteration relieved the fibula of its articulation with the calcaneum and the tibia became the weight-bearing axis of the crus. The formation of the subtalar joint permitted so-called supination and pronation for the first time, and formation of the transverse tarsal arch.

The origin of warm-bloodedness in birds and mammals is apparently from small thorapsid forms suggesting that arboreal existence produced same. Strenuous, continuous effort of climbing seemed to have produced changes as seen in the heel development, and in the development and differentiation of the flexor muscles to the heel and to the toes, and finally in the prehensile character of the hallux and the digits.

Morton[8] states, "Proanthropoid stage in primate evolution is significant in the development of foot structure because attainment of the upright posture introduced definite changes in the body. In fact when all the testimony dealing with body posture is brought together, it points toward the following conclusions: (1) The upright position of the body demonstrated by the gibbon was first acquired by arboreal proanthropoids through the development of brachiating habits; (2) the portion of the proanthropoid group representing the original members of the human stock adopted ground life as erect bipeds sometime during the Miocene period, after all their upright arboreal posture had been definitely established by structural and neurological changes; (3) the semi-erect posture of the great apes is a reversion to quadrupedism caused by overdevelopment for brachiation."

The typical anthropoid foot is best represented by the chimpanzee. It is a highly developed grasping mechanism with a moderately developed heel. In the effort of locomotion in the anthropoid foot, the propelling force exerted through the heel by the calf muscles is thrown

against the center of transmitted weight. Because of the latter's medial position on the inner border of the foot, the thrust is directed forward upon the first and second metatarsal bones. Gorilla feet demonstrate the results of such usage in an increased stoutness of the second metatarsal bone as compared with that of the three outer ones, and in a lengthening and a heavier development of first metatarsal bone and toe. The increased length of first metatarsal bone is especially observable in the feet of the mountain gorilla, when in some specimens it extends nearly as far forward as the *second.* The change is of particular interest because it demonstrates how the comparatively short hallux of an arboreal foot has developed into the predominating great toe of man.

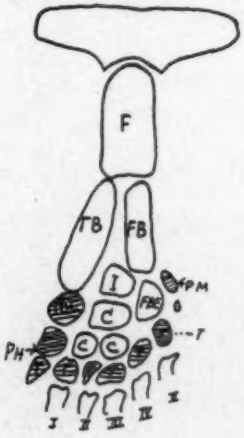
The divergent hallux was a necessary feature of arboreal life but with the permanent adoption of terrestrial habits, leverage action supplants the grasping function in importance. While the gorillas have retained a wide divergence of the hallux, measurements made by Shultz[9] on the feet of the chimpanzee, the lowland and the mountain gorilla, demonstrate a progressive reduction in the angle of abduction. Thus the typical modification of gorilla feet may be seen to be specifically terrestrial in character, and they present an unmistakable parallelism in the direction of human conformation. Upright body posture and the transfer of the foot's leverage axis to the inner border, as arboreal attainments of a proanthropoid stage, may be viewed as the preparatory steps for the later appearance of mankind. The final stage was instituted by a complete change from an arboreal to a terrestrial existence.[1]

The development of the human foot after terrestrial existence began probably was greatly aided by Wolff's Law which is concerned in the general growth and development of bones. "Bones in their external contour and internal architecture conform to the intensity and direction of the stresses to which they are habitually subjected."[10] Although this law applies to the development of bone tissues in individuals, the operation of an analogous agency may be recognized in the adaptive alterations of bones in evolutionary changes, and especially of the limbs. For analysis shows that the changing design of bone in these adaptive modifications bears consistently the same relation to the mechanical stresses of function as is expressed in Wolff's Law. These adaptive alterations are more than a fortuitous difference in form; they give evidence of orderly and economic purpose, being manifested both positively (by hypertrophy) and negatively (by atrophy) in accordance with the degree and manner in which different bones are involved in functional stresses. Examples of such changes are to be seen in the greatly amplified single-toed development of the horse's foot, and the long arm of brachiating apes. Other factors which influence evolutionary change in bone design are vegetative, or growth-controlling factors possessed by the organism, which have an apparent effect in accelerating or retarding the rate and degree of adaptive modification. Examples are artiodactylate, feet of the pig, and the antelope. Vegetative change creates a new physical condition which invites an alteration in the manner of function whereas a truly adaptive change is one in which an alteration in function is apparently introduced by some new environmental or other factors, and operates to promote a subsequent redesigning of structural parts in accordance with the altered intensity and direction of the stresses which affect them. Vertebrate feet furnish a wide range of adaptive changes wherein structure and function are intimately correlated, and there

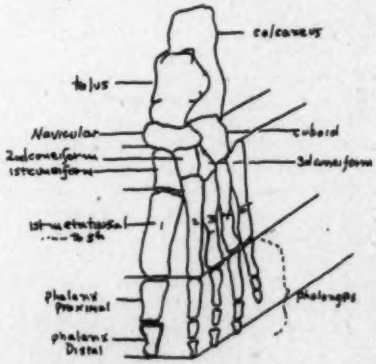
seems little reason for hesitation in using this premise as a *basis* for studies in the development of the human foot.[11]

Elftman and Manter[12] in their discussion of foot evolution conclude, "There are superimposed upon fundamental similarity important differences which allow us to make the following list of the most important changes which the foot has undergone in its evolution from ape to man: (1) Stabilization of the transverse tarsal joint in a position of plantar flexion. This accounts for the long arch and partially for the alignment of the lateral metatarsal with the long axis of the calcaneus; (2) Prevention of extensive eversion in the lower ankle joint, partly by the appearance of a new process, the anterolateral process of the calcaneus; (3) Rotation of the trochlea of the talus with respect to the body of the bone, and raising of the medial border of the trochlea, correlated with the changed position of the tibia in upright locomotion; (4) Torsion of the metatarsal heads, allowing flexion in the metatarso-phalangeal joint perpendicular to the ground. This eliminates the anterior transverse arch as a functional factor and allows the distribution of pressure over the ball of the foot; (5) Permanent adduction of the hallux, forming a strong anterior support for the long arch; (6) The following changes in proportion, (a) shortening of the four lateral metatarsals and their phalangeal series, (b) increase in the relative strength of the cuboid,

*OSTEOLOGY OF THE PRIMITIVE AMPHIBIAN FOOT



OSTEOLOGY OF THE HUMAN FOOT



F	— Femur	CC	— Centralia
TB	— Tibia	TT	— Tarsalia
FB	— Fibula	12345	— Metartarsalia
I	— Intermedium	PH	— Prehallux
TBE	— Tibiale	PM	— Post minimus
FBE	— Fibulare		

*After professor William K. Gregory, American Museum of Natural History.

navicular, and first and second cuneiforms; (c) increase in stoutness and length of the calcaneus. Although the gorilla resembles man more closely than does the chimpanzee in the relative shortness of the lateral digits, it shows no indication of the more fundamental changes such as those in the transverse tarsal joint which are essential for the development of the human condition. The fact that the human foot, adapted as it is for walking on the ground, became a closer resemblance to the ape foot as used in arboreal rather than in terrestrial locomotion may be regarded as another evidence of man's arboreal ancestry. It would also suggest that the essential features of man's feet were acquired at an early stage of his terrestrial existence rather than after long apprenticeship on the ground. It will be perfectly possible, however, for a human type of foot to evolve from *either* the chimpanzee or gorilla foot as now constituted, since the structure which, by modification, can give rise to the human structure is still intact."[13]

This was shown by Straus when he concluded that: "The easily recognizable structural resemblance of the fetal foot and leg of man to those of adult arboreal primates, with the subsequent loss of primate characteristics in the attainment of the distinctly human condition, suggests strongly that here we see in the main a recapitulation of ancestral conditions. No other logical explanation can, at least at the present time, be offered for the many simian characters found in utero. From the third to the seventh or eighth prenatal month the structure and proportions of the human foot are quite similar to the generalized arboreal type of foot common, in slightly altered form, to many of the lower primates. During this period of human antogeny the foot is markedly supinated, it exhibits relatively long phalanges and short tarsus, the short hallux is divergent and somewhat apposable, and the leg-foot index, as among the arboreal primates, is proportionately high, furthermore, the foot leverage is low and the entire ankle region is primitive. A prominent heel is lacking, as is also the case among the tree-inhabiting members of the order. It is quite evident from all this that the foot of foetal man is not only vastly different from that of the adult human, but that it is one whose structure makes it unfitted for an upright terrestrial existence. It is a foot in many, if not in most respects, not unlike that possessed by the adult gorilla, although in some respects it is even more primitive than that of the largest of the anthropoid ape. Most of these ancestral characters are to a great extent lost before birth; many, however, persist in adult man in a vestigial condition. The fact that the feet of man and other primates are much more alike in early stages of development than they are later in life, most of their adult differences being produced through divergent growth, points strongly to a basal type of foot from which the variously specialized feet of all the primates developed phylogenetically as well as ontogenetically. This last theory should, by nature of the evidence now at hand, be restricted to the monkeys, apes and man in that the ontogeny of the foot in the Lemuroidea and the tarsioidea is at the present time unknown."[14]

Let us finally say that the original representatives of the human stock are to be recognized on those members of the Miocene proanthropoids who forsook their previous arboreal existence and as upright bipeds permanently adopted ground life. Since taxonomic relationship is judged primarily upon the basis of morphological characters, human origin can logically be regarded as conceived in this fundamental change

of environment, because it was there that those adaptations for terrestrial bipedism were begun which, through modification of foot and body structures were gradually to distinguish man from the most closely related forms. The complete transfer of the function of locomotion to the lower extremities through the adaptation of ground life insured the development of the human race's type of foot, and a progressive improvement in man's upright carriage. As brachiation efficiency developed, change in environment gave these hands freedom from locomotion and assigned them to the service of man's tremendously developing nervous system.

Footnotes

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2 Ibid.

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4 Op. cit., Dudley J. Morton, pp. 15-17.

5 Bobb Schaeffer, *The Morpthological and Functional Evolution of the Tarsus in Amphibians and Reptiles, Bulletin of The American Museum of Natural History,* Vol. LXXVIII, article VI, pp. 470-472. New York, 1941.

6 Refer to the diagrams, Osteology of the Primitive Amphibian Foot, and Osteology of the Human Foot.

7 Op. cit., Bobb Schaeffer, pp. 470-472.

8 Op. cit., Dudley J. Morton, p. 24.

9 Referring to Adolph Schultz of Johns Hopkins University.

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MAKE RESERVATIONS EARLY

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INJECTION THERAPY FOR VERRUCAE

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A WART or verruca, being a benign epithelial new growth formed by papillary hypertrophy, may occur at any location on the cutaneous or mucous-membrane surface. The lesion is believed to be infectious and is thought to be caused by a filtrable virus. It is auto-inoculable and also transmissible by inoculation. According to the shape or location of the wart, Ferguson[3] points out, specific anatomic names have been applied to the lesions.

Etiology

The etiology of plantar warts is not known although Kuhnemann[6] describes a bacillus which is believed to be pathogenic. Certainly plantar warts, Dickson and Diveley[1] say, are infectious in origin and having occurred the infection tends to spread to other parts of the foot.

Clinical Varieties

The four chief clinical varieties are: verruca vulgaris, the common wart; verruca plana juvenilis, the flat juvenile wart; verruca plantaris, the plantar wart; and verruca acuminata, the venereal wart or condyloma. Another minor type is verruca digitata, a growth with numerous finger-like processes. The so-called seborrheic and senile warts are not classified[3] under verrucae, since they are really keratoses, present an entirely different histopathology and are precancerous lesions.

Classifications

1. Verruca vulgaris is the ordinary wart or simple papilloma, which[8] is mildly contagious and is the result of virus infection.
2. Verruca plantaris is an ordinary wart pushed into the cutis, resembles[8] a small oval callus, is sensitive to pressure and beneath the thickened lid it presents a cavity containing moist, tough corneous material.
3. Mosaic warts appear[8] in large patches on the soles. They are dry, more or less painless, tend to progress and are radioresistant.
4. Verruca plana juvenilis is characterized[8] by the occurrence of multiple flat warts which somewhat resemble lichen planus.
5. Verruca senilis and verruca seborrhoeica is represented[8] by the pigmented flat, greasy wart; this type of wart generally occurs in old people.
6. Angiokeratoma is a disease of the skin characterized[2] by telangiectases or warty growths, in groups, together with thickening of the epidermis. (Mibelli 1889). The disease is seen chiefly on the feet and legs of children. Also called telangiectatic warts.

Plantar warts are not sensitive to normal pressure at the onset of the infection, however, they become sensitive after some months when local acute discomfort ensues. A most diagnostic point is excruciating pain on the application of medial to lateral pressure or pinching of the involved area.

Differentiation of Above Conditions from Melanoma

Melanoma is the most malignant of all skin tumors and one of the most malignant of all tumors. It constitutes about 1 per cent of all malignant tumors and causes 0.5 to 1 per cent of all deaths from malignant growths. Though this tumor may be found at practically any

age, it is most frequent in middle aged individuals. There is no significant difference in incidence between the sexes. It is reported[3] that the areas of predilection are the head and lower extremities, especially the feet. A malignant pigmented tumor usually starts as a pigmented mole, which first shows signs of malignancy by an increase in its size and depth of pigmentation, and later rapidly becomes a nodular papilloma. It may fungate and slough, with disseminated cutaneous brownish or blackish (melanin containing) satellite growths, and eventually show[2] lymphatic and visceral metatasis.

Treatment

The results of treating verruca have always been uncertain, therefore various types of therapy are employed. The following treatments listed are familiar to all practicing chiropodists with a variation in results.

1. Surgery.
2. Chemical cautery-carbolic acid, nitric and the like.
3. Electrolysis-desiccation, coagulation.
4. Galvanocautery.
5. Fulguration.
6. Radium.
7. X-ray.
8. Injection with sclerosing agents.

Hutton[4] reported on the injection of sclerosing solutions into the base of the wart. This is done without anesthesia, using a tuberculin syringe and a fine-gage needle. Any of the solutions used for the injection of varicose veins, such as quinine, urethane or sodium morrhuate solution, may be used. The heavier solutions appear to have a distinct advantage in that they remain localized at the point of injection. Only a few drops are needed. The wart becomes dry and hard after a few days and after ten days to two weeks or longer, depending on its size and the thickness of the surrounding skin, it drops off or can be trimmed off, leaving a practically normal skin underneath. Hutton[4] has used this method of treating warts with complete success in many cases.

Lurie[7] has reported excellent results following the intramuscular injection of Bismuth Subsalicylate in a 10 per cent suspension in vegetable oil.

I have used an aqueous solution of Bismuth Sodium Tartrate 1½% (Searle) in the following manner:

This injection is given without local anesthesia. The area of operation to be injected; that is the verruca or verrucae is sterilized with tincture of green soap, followed by Metaphen or any other commonly used preoperative antiseptic. A 27 gage, 0.5 inch hypodermic needle, together with one's favorite graduated glass syringe (sterilized), is used.

The skin is pierced immediately outside the zone of hyperkeratosis, downward and inward toward the base of the verruca; the needle is to be kept just above the corium with its bevel toward the base of the verruca. This insures the instillation of the solution at the proper site. In large verrucae both sides of the lesions should be injected with approximately 1 minim (drop) at each site. Because of the resistance of the tissues at this point a great deal of pressure is required to force the solution into the tissues. If this pressure "feeling" is not experi-

enced, the area will be injected at the wrong site. If the Bismuth Sodium Tartrate 1½% is injected freely as a rule no results will be evident or a sloughing of tissue will result. Usually the amount injected is 0.5 to 2 minims (drops); this is to be determined by the size of the verruca. Three days after the injection a hemorrhagic area will appear through the keratotic surface. Various types of verruca will not hemorrhage, but pain will be relieved. The surrounding redness which is usually present in most painful verruca, will be reduced or completely absent in approximately seven days. After the first injection the verruca usually flattens out or becomes smoother. If after two weeks, following the hemorrhagic appearance, the lesion does not come off it should be removed and study made to determine if the verruca is still active.

During the two weeks after injection, the patient is requested to visit the office every three days and is instructed to notify the doctor as soon as possible if, between office visits, throbbing is present for one or more hours. At the sign of throbbing the area is to be removed and dressed with an antiseptic ointment. The author's experience has been that throbbing and removal of the area have occurred in from one day to two weeks after injection. If this reaction does not take place, a drying and normal superficial slough of the horny tissue can be expected. When a normal underlying epidermis is found the patient can be dismissed, if not and the verruca is still active it can be reinjected. A normal epidermis is usually present in approximately eight weeks after injection. In a few cases hyperkeratosis persisted in the peripheral portion of the verruca, this can be treated and removed with Salisacom or 40 per cent salicylic acid in lanolin. No lesion required more than two injections. Case history cards reveal that less than 3 per cent of all verrucae injected required two injections.

Results

The fifty histories presented are reviewed as to the time element required for the verrucae to slough and consequent normal epidermis.

2 weeks after injection 5 patients showed no evidence of activity.
3 weeks after injection 10 patients showed no evidence of activity.
4 weeks after injection 10 patients showed no evidence of activity.
5 weeks after injection 8 patients showed no evidence of activity.
6 weeks after injection 10 patients showed no evidence of activity.
7 weeks after injection 1 patient showed no evidence of activity.
8 weeks after injection 6 patients showed no evidence of activity.

All cases were checked at monthly intervals for one year after injection and all showed normal epidermis. An interesting observation is that only two patients, of all those treated over a period of eight years, had reinfections by inoculation approximately ten months after the original verruca was removed. Verrucae were very easily removed with Xine and seemed to be suspended in an inactive state. Whether or not the body builds up resistance toward future infection after injection therapy is questionable, but an academic point for future observation.

In cases of multiple verruca I found that if the original lesion is injected with the sclerosing solution the other areas will dry and be easily removed with a nucleus knife. If the original verruca is not treated by injection only the area or lesion treated will become inactive, while the balance of the growths will remain active.

I have found that all the types of the aforementioned verruca will respond to injection therapy with Bismuth Sodium Tartrate 1½%.

The contraindications for such therapy are in patients with diabetes, Raynaud's disease, Buerger's disease, varicose veins, arteriosclerosis, pregnancy and conditions that affect the venous or arterial flow of blood in the extremities. However, all patients who are good operative risks can be treated successfully.

Interesting Reactions

Several most interesting reactions to injections occurred in patients who reported the presence of their verruca for three or more years.

1. A verruca was located plantar to the lateral tubercle of calcaneous, papillary root fibers extended to the lateral malleolus and between the corium and the subcutaneous tissue. Drainage was established at two sites.

2. A verruca was located plantar and between the first and second metatarsal heads, papillary roots extended between the web of first and second toes and continued to the superior surface of the foot midway to the metatarsal shafts and between them. Extensions of the papillary fibers followed a course between the corium and the subcutaneous tissue. The bases of the verruca roots were removed at this point and drainage was established at two sites. Stasis and edema and staphyloccic infection were present along the course of the roots. The papillary root fibers may extend from 0.5 inch (1.25 cm.) to approximately 4 inches (10 cm.) from the original exposed site of the verruca. I have observed that extensions are only in one direction; that is, the directional area of forced movement, but that verruca will never metatasize. Study revealed that the injection of 0.5 to 1 minim (drop) of Bismuth Sodium Tartrate 1½% in long standing and neglected verruca will reduce the edema and stasis to a minimum and also eliminate sloughing and subsequent staphylococcic infection. Injections are given at intervals of two weeks if the lesion remains active.

3. Injection therapy in four pregnant women resulted in the removal of positive verruca, but swelling, stasis and severe sloughing occurred. All of the four patients were confined to bed and free drainage was encouraged. Because of the severe reaction in these patients the warning is again made that in pregnancy injection therapy is contraindicated.

Summary

Insoluble bismuth compounds suspended in oil or in aqueous solutions are being abandoned rapidly, as are oil-soluble and water-soluble bismuth compounds since their absorption is decidedly irregular and incomplete and as a consequence encapsulated masses of oil or bismuth are left at the sites of injection.

At present aqueous solutions of bismuth organic complexes are generally used, since they are not only absorbed promptly but also are so compounded that they cause little or no local irritation.

Bismuth Sodium Tartrate, also known in the literature as sodium tetrabismuth tartrate, having a molecular weight of more than 100 is shown to possess almost ideal properties for the treatment of syphilis and other diseases. The more important of these properties are: (1) freedom from local or systemic reactions, (2) tissue-fluid solubility, prompt and uniform absorption in human beings, (3) definite retention by body tissues and fluids so that a prolonged action is obtained and (4) valuable pharmacologic and spirocheticidal properties, (5) showing very active bismuth, combined with great safety.

Since the compilation of this article G. D. Searle & Co. added 2 per

cent of benzyl alcohol to the original aqueous solution of Bismuth Sodium Tartrate 1½%. With the addition of benzyl alcohol to the solution, an immediate anesthesia of the area has been experienced instead of the usual relief from pain in one to seven days. Best results are obtained when the solution is injected at body temperature.

I have found the injection therapy to be the most efficient method of treating verrucae. If administered properly and cautiously I would recommend every chiropodist to use this method. I have used various other sclerosing solutions in my practice but the results have been varied and uncertain.

Bismuth Sodium Tartrate 1½% (Searle) is a basic water-soluble compound containing 74 per cent of bismuth. This ampuled aqueous solution is buffered with 0.5 Gm. of sucrose per each 2 cc. and 2 per cent of benzyl alcohol (v/v) is added for its local anesthetic and preservative effect.

I have used Bismuth Sodium Tartrate 1½% (Searle) in the treatment of verruca for the past eight years with most satisfactory results and with rapid removals much to say patients' gratitude, and therefore recommend its use in all types of verruca in which obliterative therapy is indicated.

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THE LOCAL FOOT AND LEG EXAMINATION*

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PRE-WALKING AGE—At birth baby boys have feet that average 3.2 inches long and baby girls 3.1 inches long. The foot of the newborn has a position in between that of fetal life and adult life. Calcaneal position changes from varus position in the foetus to a lesser degree of varus in the newborn. The anterior part of the foot in foetal life is proportionately much wider than in the newborn. The infant foot is like a triangle, very wide across the toes, less wide across the ball and narrow at the heel. The proportion is interesting because for so many years shoe manufacturers have built shoes for the foot which neutralizes or reverses these dimen-

*This article is an excerpt from "Podopediatrics—the Care of Children's Feet," a book to be published in the near future by the author.

sions. Although the proportional width of the anterior foot to the posterior foot decreases as the child grows to maturity, the style setters in adult shoes go to extremes in modifying their lasts. Careful inspection will show that in the adult the narrowest part of the shoe is usually across the toes. The foot becomes longer and narrower as the infant grows to childhood and then to maturity.

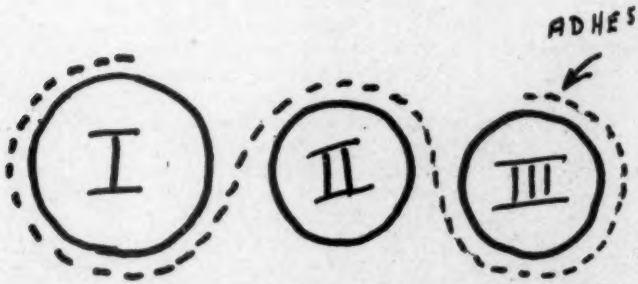
Although the length of the second toe exceeds that of the first toe in foetal life, the first toe at birth is usually a little longer. The foot rapidly increases in length.

The mobility of the toes is very great in infancy. On inspection the feet are found most frequently in a position of valgus. This seems to be due to the fact that the everter muscles of the foot are stronger than the inverter muscles. Also motor coordination and motor ability which necessitates balance of these muscle groups when the child begins walking will not be present for almost a year or more. The infant's foot also shows some deviations from the so-called classic "Norm" which are of interest. The public has for so long been of the opinion that it is only when the child begins to wear shoes that the baby toes are injured and deformed.

Normal Variations—In about 25% of all infants the second toe overlaps the third toe, or to a lesser extent may underlap the third toe. This position of the second toe is very commonly seen. A deviation of this is a second toe which is raised higher and slightly pushed back on to the second metatarsal head. These findings we consider normal and as a rule by the time the child reaches the age of four the position is corrected without treatment. Where the toes tend to keep their poor position simple adhesive tape splinting will prove sufficient for correction.

Adhesive tape one quarter of an inch wide is used. Care should be taken that at no time are the toes completely encircled by the tape. To correct a raised second toe we start our adhesive on the dorsum of the great toe, then travel around the toe and over the second toe creating proper tension, then under the third toe and up around ending on the dorsum.

Diagrammatically the adhesive splint looks like this:



By causing proper tension on the tape we can place the toe in any position we wish.

The best age for instituting adhesive tape corrections for the toes is about four years. However, there is no need for hurrying and there is time up to eight years to institute corrective toe splinting.

There are any number of adhesive splint variations depending upon the problems involved.

Instituted at about three years of age this method gives excellent results in a short time. The next very common deviation occurs in the 4th and 5th toes. These toes in about one out of 15 children are usually bent towards the midline of the foot. The thing to bear in mind is that these deviations from what we picture as normal occur in children who are too young to wear shoes. It is not uncommon for a mother to bring us a child of about two years and blame these deformities on the shoes that the child was wearing. Most often they are congenital as described.

Very commonly the infant of seven months to a year presents toe nails which are curved down and almost bend back into the front of the toe. This position of the toe nails is due to the fact that present-day infants almost invariably are prone sleepers. In this position the infant presses the toes into the bedclothes and usually crawls towards the head of the crib. This causes the peculiar position of the nails. Nothing need be done since they straighten out as the child grows older.

The prone position also causes other problems. Some children in this position sleep with their legs rotated out so that the inner border of both feet lie flat against the bed. When these children begin to walk external rotation of the legs is very marked and the foot is everted and abducted as a result of this position. Therapy here is to exercise by passive inward rotation of both legs done by the parent and by placing long pads under the arch of the foot. Also the use of innersole and heel wedging. Pigeon toed gaits are encouraged in these children and games are taught which contain these positions for the feet.

Knitted wool booties used by the infant during this pre-walking age are used very early by most parents and usually are part of the newborn infant's gift trousseau. As a result they are made very small and cute looking. In our experience these booties are a hazard, and their use should be discouraged since they usually cause binding of the toes. Anything large enough and warm enough to protect the foot of the infant at this age may be used. Unfettered motions of the infant's toes and feet are necessary for the proper growth and development of the muscles and bones of the lower extremities. This is the only age during which soft soles are used, the non-weightbearing age. Once the child's foot becomes a weightbearing structure, strong shanks and flexible foresoles should be used.

The arch is present in the feet of newborn infants and in pre-walking children. Fat pads in fat children may obscure the arch. Dorsal fat pads may also be present. These pads usually disappear at about four years of age.

The most important criteria for footwear in non-weightbearing infants are warmth and looseness. We feel that warm feet are as important in the prevention of colds in the infant and child as are anti-cold vitamins. During infancy the function of the foot is not a weightbearing one. Movements of the foot and toes develop the bones of the foot and leg, build

up tone in the ligaments, exercise foot and leg muscles and generally prepare the foot for its future weightbearing activity.

The proportion of the infant's foot is divided up as follows:

In the infant *the relative proportion of the* tarsal area of the foot is five, the metatarsal area three and the phalanges two. When compared to the chimpanzee which has the relative proportion, tarsal three, met. 3 plus and phalanges three plus we see that the evolutionary picture in the main points to development of the tarsus.

The heel of the infant's foot is relatively small, the sole triangular in shape and the inner and outer pads (thenar and external plantar pads) are still separated by a crease. This picture is a throwback to the bony pronograde foot with small heel and many well developed volar pads. (Testballen.)

The local foot and leg examination—Carefully note: The Postural Position of the feet and legs. Test the motions of the foot joints and ankle knee and hip. The motions must be free and complete. Any restriction to free motion must be completely investigated for bony blocks, cartilaginous blocks, congenital fusions, muscular shortenings. There should be no restrictions or limitations of motion. *The infant fat pads*—the fat pads normally seen in the feet of infants are usually present up to about four years of age.

We have found three common varieties of fat pads.

a. A large fatty pad which covers the longitudinal arch and gives an appearance of flatness to the foot.
b. A deviation of the first type is a small round mass about the size of a marble which is frequently seen under the ast-scaphoid area of the foot.
c. A large dorsal fatty pad which lies over the metatarso-phalangeal joints on the dorsum of the foot. This fatty pad is usually a source of worry to the parent because of the peculiar shape it gives the foot. It also makes shoe fitting of the infant a difficult task.

None of these fat pads are in any way a problem for future foot health. They all disappear gradually and are gone by the age of four.

It is interesting to note that thin babies do not as a rule show any fat pads and in most infants the arched structure of the foot is readily discernible. The infant's feet may have many characteristics of one or both parents. Postural weakness or pronation seems to be very dominant.

The average child shows some degree of pronation from mild to extremely severe. About ninety-seven percent show the poor postural pronated stance which must be considered a potential weakness. This pronation may be very mild or very severe.

The motions of the child's ankle, knee and hip are much freer than in the adult.

The gait is studied.

The child is asked to rise from a supine position without aid, if it is already of walking age.

The important thing to note in the examination of the young infant and child is to rule out fixed deformity and limitation of motion.

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METATARSAL PAIN OF SYSTEMIC ORIGIN

DAVID M. SIMON, Pod.G.
Buffalo, New York

MRS. M. W., aged 36, was referred to this office by her physician for examination.

The patient's chief complaint was of intense pain dorso-plantarly at the medial aspect of the third metatarsal head of the left foot, with lancinating pains extending distally into the third digit. The pain had been intermittently present for five days, with no regularity as to time of day. The patient could sometimes, but not always, obtain relief by removing the shoe. She was short and obese, weighing 175 pounds, and two weeks before examination, had changed from a sedentary occupation to one which required her to stand at a machine eight hours daily. The only relevant medical history that could be elicited was that she had not had a dental examination for two or three years, although she was conscious that her teeth were troublesome.

Objectively, there was marked depression of the second and third metatarsal heads, with heavy callosities plantarly, in addition to all the signs and symptoms of bilateral weakfoot, including non-rigid dorsiflexion of the four lesser digits. The shoes were short, pointed and narrow.

Dorso-plantar and lateral radiographs of the involved area revealed no bony pathology.

Initial treatment, based on a tentative diagnosis of mechanical or traumatic neuralgia not unlike the familiar Morton's syndrome, consisted of a one-quarter inch metatarsal pad adhered to the plantar surface of the area, together with a plantar and dorsal hammer toe pad for the third digit. Proper shoes were prescribed, and the patient was advised to have a dental examination made.

The patient's dentist thereupon advised and performed extraction of three diseased teeth which he stated could have been foci of infection.

The patient meanwhile reported that she had experienced only slight and temporary relief from the paddings and change of shoes, and two weeks after the tooth-extractions the foot pains had aggravated to the point where neither local treatment nor complete bed rest gave any relief. At this time the possible presence of an incipient periostitis which had not progressed sufficiently to be visible on the first radiograph was considered, and a second radiograph was taken. This second picture disclosed a slight periostitis on the medial aspect of the distal phalanx of the third digit. The pathology was sufficient to change the bony outline at the point of involvement. This was more easily seen on comparison with the first picture taken several weeks before.

The patient was then returned to her physician for blood and urine analyses. The urine was negative, but the blood showed a positive Wassermann reaction. Another blood sample was taken, and the result was again a positive Wassermann reaction. Systemic therapy was therefore instituted at once. At the time of writing, the patient has been under this therapy for about three months. The symptoms in the toe have subsided completely, and there has been no recurrence. A recent x-ray shows normal bony conformation of the distal phalanx of the third toe. The patient's children, who live in another city, were examined for possible infection and found to be negative.

Brisbane Bldg.

REPORT ON SCHOOL FOOT HEALTH PROGRAM

J. E. VAN ETTEN, D.S.C.
Greenville, Texas

On February 11, 1947, the writer began a school foot health program in Hunt County, Texas. This program consisted essentially of examinations of the feet and ankles of all the school children in the county. Parents of children who required professional attention were notified to that effect by a printed form postal card. The card suggested that the child be brought to my office for consultation regarding the condition, necessary treatment, etc. The card also stated that if the parents wished to consult their family physician, my records and recommendations would be furnished to him upon request.

At the time this preliminary report was written, the program had been in operation for seven weeks; sixteen hundred school children between the ages of six and fourteen had been examined. Of this number, one hundred sixty-one required professional care. This would apparently indicate that approximately ten per cent of all the children examined in this age group had some type of foot disorder.

The most common condition found was a congenital ankle valgus. Usually the following symptoms were in evidence: calcaneal eversion, ankle valgus, pronation of forefoot, slight hallux valgus and acquired pes planus (usually incomplete). The child often complains of pain in the calf, leg or inside of the thighs. The patient usually walks with a toeing-out gait.

The milder cases of this condition are being corrected by shoe wedging. The wedge is placed along the outer border of the shoe and is feather edged, ending toward the center of the sole. A Thomas heel is used in conjunction with this and is wedged on the inner side of the heel. The wedge varies in thickness according to the severity of the case (usually one-eighth to one-quarter inch is sufficient). This type of wedging is intended to force the body weight toward the outside of the heel and then along the lateral surface of the foot to the head of the fifth metatarsal; then due to the sole being wedged along the lateral surface the body weight is carried across the metatarsal heads toward the great toe.

In severe cases of ankle valgus with calcaneal eversion, additional treatment is required. I usually recommend a modified or metal Whitman brace which can be worn comfortably by the child and is not visible. It should have a deep heel seat, a lateral and medial flange, and a metatarsal raise if desired. The brace should be made from a cast and print of the foot. Wedging can be used with the brace when necessary.

The next most common condition found during the examinations was adduction with supination. This condition was not considered serious because the author believes that some degree of toeing-in is desirable in children. The severe cases were treated with sole wedging and the milder cases were left unattended.

The examinations reveal that shoes were a responsible factor in causing blisters, ingrowing nails, corns, hammer toes, pes cavus, bursitis and hyperidrosis. All these conditions were treated in a routine manner and parents were instructed as to their cause and in prophylactic measures. The pes cavus conditions are apparently due to the wearing of "cowboy boots." Hyperidrosis was due to wearing non-ventilated tennis shoes or

sneakers which some of the boys wore to school regularly. It is my opinion that the hallux valgus condition found in the children examined was due primarily to: heel eversion, ankle valgus, and the resultant abduction of the forefoot.

All children with run-over heels were instructed to have them repaired and a short foot health lecture was given in each classroom. Authority for the examinations was obtained from the county superintendent of schools, several city superintendents of schools, the county health unit, and the county medical society.

411 Medical Arts Building

CHIROPODICAL SHOE THERAPEUTICS; WEDGING vs. PADDING

PAUL J. McNULTY, A.B., D.S.C.
Scranton, Pa.

DURING the past decade a number of theories and techniques have achieved considerable acceptance as basic tenets of the profession. Perhaps, nevertheless, an occasional re-examination of some of our beliefs would not be harmful.

Shoe therapy is an established modality which is used, to greater or lesser extent, by practically every chiropodist. This paper will take a second, and questioning, look at certain widely held beliefs and practices in the field of shoe therapy.

It may be apropos, first, to differentiate between shoe wedging and shoe padding:

Shoe wedging: The use of a leather wedge, either on the outer plantar surface of the shoe or incorporated in the shoe structure itself—but not in direct contact with the foot—for the purpose of re-distributing body weight.

Shoe padding: The adhering of a pad of appropriate material to the inner surface of the shoe, in direct contact with the foot, for the same or a similar purpose.

Shoes in general are manufactured on horizontal planes and perpendicular planes. It is the author's contention that typical shoe wedging distorts these horizontal and perpendicular planes and leaves the shoe with a shank that has been displaced (bent). The end-result is that counter, waist and instep of the shoe are twisted from the original horizontal and perpendicular planes on which they were manufactured. Shoes thus distorted, in my belief cannot achieve or secure the desired corrective functioning.

As an example of such maladjustment, consider the typical heel wedge: If we raise the medial border of the heel one-quarter inch, we will find that the shank will bend, causing the anterior portion of the shoe to lean medially, and the posterior portion of the shoe to incline laterally. This distorts the horizontal plane on which the shoe was manufactured. At the same time, the upper structures of the shoe are pulled out of line. The anterior upper portion of the shoe will be in true line, but the posterior upper portion of the shoe will be distorted. Since it is raised on the medial side, the leather of the upper (counter extension) will impinge on the inner surface of the heel of the foot, and

create pressure and friction, while the lateral portion of the upper will be loose, as the leather has been bulged laterally. This disturbs the perpendicularity of the shoe, and all these faults together will in time ruin the shoe. Moreover, the foot in a shoe so doctored will be ill-fitted, improperly supported, and uncorrected.

Allowing for difference in location on the shoe and for the resultant differing stresses, similar distorting effects can be expected from the use of such non-corrective shoe wedges as those listed below. It should be borne in mind, for example, that where the posterior portion of the shoe was distorted in our illustration, the anterior portion would suffer when the anterior part of the shoe is wedged. Non-corrective wedges I would list as:

1. Heel wedges (medial and lateral)
2. Metatarsal wedges
3. Mid-tarsal wedges
4. Anterior tip Medial wedges
5. Anterior tip Lateral wedges
6. Medial sole wedges (Dutchman)
7. Lateral sole wedges (Dutchman)
8. Full medial wedges
9. Full lateral wedges

The following shoe wedges, however, do not affect the horizontal and perpendicular planes of shoes, and their use is advocated in conditions which they are designed to correct:

1. Thomas Bar
2. Mayo Bar
3. Crescent Bar
4. Anterior Heel
5. Kidney Bar
6. Sole Extension

The author is of the opinion that padding of shoes, *inside the shoe,* with corrective features that come in direct contact with the foot, is far more efficiently corrective in disabilities where shoe corrections are indicated than are the various types of external wedges in the first list, above.

Padding, properly done, will keep shoes in their intended horizontal and perpendicular planes, and will provide adequate correction without disturbing shoe alignment. Satisfactory shoe padding can be performed with felt, cork, leather, or rubber, properly sized and shaped.

This article is presented to the profession as a new line of approach to shoe therapy, and in the hope it will stimulate fresh thinking on basic principles.

624 First National Bank Building.

N.A.C. CONVENTION

AUG. 21-26, 1947

GRAND RAPIDS, MICH.

THE

JOURNAL

OF THE

NATIONAL ASSOCIATION of CHIROPODISTS
PODIATRISTS

PUBLISHED UNDER THE DIRECTION OF THE COUNCIL
BY THE NATIONAL ASSOCIATION OF CHIROPODISTS

DR. WILLIAM J. STICKEL, EDITOR
3900 FOURTEENTH STREET, N. W.
WASHINGTON, 10, D. C.

Address all communications intended for publication, matter relating to advertising, business or subscriptions to the Editor.

DOCTOR — PLAN THAT TRIP FOR AUGUST 21-26 TO THE N.A.C. CONVENTION. LATEST MODELS AND USES OF EQUIPMENT, INSTRUMENTS, DRUGS, SUPPLIES, APPLIANCES, ETC., WILL BE DISPLAYED AND DEMONSTRATED.

1947 FOOT HEALTH WEEK A SUCCESSFUL PUBLIC EDUCATION PROGRAM

PRELIMINARY reports from all states indicate that Foot Health Week was an outstanding success. More than two hundred state and local committees cooperated in the N.A.C. program. Nearly three thousand individual orders for material were filled.

The Mennen Co. gave us its usual excellent support for which we extend our sincere appreciation. Bauer and Black, P. W. Minor, Inc., and over one thousand pharmaceutical and shoe manufacturers and retailers also contributed to the success of the Week.

We cannot at this time list, classify and evaluate the thousands of clippings, reports on radio mentions, etc., which have been received. A complete report will be made as soon as possible.

We wish to thank all firms, committees and individuals who participated in 1947 Foot Health Week.

Dr. Harry W. Weinerman
Chairman, Foot Health Week Committee

F.A.A.C. TO SPONSOR PRE-CONVENTION COURSE AT GRAND RAPIDS, MICHIGAN

Famous English Physiotherapist to Visit America

DR. JAMES B. MENNELL, internationally recognized authority in the field of physiotherapy, of London, England, will be presented in a two-day, pre-convention course at Grand Rapids, Michigan, by The Fellows of the American Academy of Chiropodists. This outstanding feature which brings Dr. Mennell for the first time before any chiropody group, will be held in conjunction with the National Association of Chiropodist's Annual Convention at the Pantlind Hotel in Grand Rapids. The course will be held on August 20th and 21st, two days prior to the convention's opening. It will be limited to the first one hundred practitioners to register. Dr. John W. Witte, 2010 East 102nd Street, Cleveland, Ohio, is in charge of this project, and all reservations, with your check for $25.00 for the two-day course, should be sent at once to Dr. Witte. Individual instruction and special demonstrations make it absolutely necessary that this course be limited to one hundred. Physicians may be registered as guests of chiropodists for this course for the same fee.

NOTICE TO MEMBERS

THE SCIENTIFIC COMMITTEE IS PREPARING AN EXCELLENT PROGRAM FOR THE N.A.C. CONVENTION IN GRAND RAPIDS, MICHIGAN, AUGUST 21-26, 1947. PLAN TO ATTEND — MAKE RESERVATIONS IMMEDIATELY.

Thirty-Fifth Annual Convention

NATIONAL ASSOCIATION OF CHIROPODISTS

August 21-26, 1947
Civic Auditorium and Hotel Pantlind
Grand Rapids, Mich.

Make your hotel reservations early—
Send them to Dr. Bernadette Marshall,
Chairman, Reception Committee,
405 Ashton Bldg., Grand Rapids, Mich.

- Meetings of N. A. C. Committees and Affiliated Organizations Aug. 21st.
- Business Sessions Aug. 22nd-23rd.
- Scientific Sessions Aug. 24th-25th-26th.
- Exhibits Aug. 22nd-Aug. 26th.

"GRAND RAPIDS, MICHIGAN—THE GATEWAY TO THE NATION'S PLAYGROUND"

MEMBERS, ATTENTION—IMPORTANT

Registry of Orthopedic Shoe Repairmen

THE House of Delegates in August, 1946, approved the compilation of a "Registry of Orthopedic Shoe Repairmen."

We are beginning this project by requesting information from (a) state societies (b) local divisions (c) individual members.

Practitioners who utilize the services of orthopedic shoe repairmen are urged to send the Executive Secretary the following data:

1. Name of Orthopedic Shoe Repair Shop
2. Name of Owner
3. Address—City—State
4. Brief Description of Types of Service Rendered by Orthopedic Shoe Repairman.

If data is being submitted for more than one shop, use separate sheet for each.

When a sufficient number of replies to this request is available, lists of orthopedic shoe repairmen will be forwarded to each state society for checking and approval or rejection. A national registry will be published when this check-up has been completed.

Qualifications and standards for orthopedic shoe repairmen based on skill, cooperation, and other essentials are being studied by this committee and will be submitted to the House of Delegates when completed.

Your assistance in this project will be appreciated.

Send the information as soon as possible to Dr. William J. Stickel, Executive Secretary, 3500 14th St., N.W., Washington 10, D. C.

NOTICE—N. A. C. OFFICE WILL BE CLOSED FROM AUGUST 16th TO SEPTEMBER 27th

THE N.A.C. OFFICE will be closed from Aug. 16th to Sept. 27th in order to give the Executive Secretary and office staff an opportunity to take a vacation. Members are requested not to communicate with the Executive Secretary during the period between the dates announced. Replies to correspondence will be resumed on Oct. 1, 1947. Your cooperation will be appreciated.

WM. J. STICKEL,
Executive Secretary

COPY DEADLINE FOR JOURNAL

DEADLINE FOR JOURNAL COPY IS THE 15TH OF THE MONTH BEFORE PUBLICATION.

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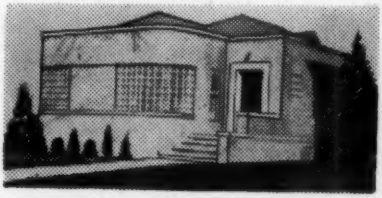

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For details, see page 37

Complete Your Enrollment Card and Mail To:
MANAGER, N.A.C. PLAN
c/o Dr. Wm. J. Stickel
National Association of Chiropodists
3500 14th St., N.W., Washington 10, D. C.

GROUP PLAN OF INSURANCE ANNOUNCED

Exceptional Protection Made Available to Members

DR. R. V. HEALY
Chairman, Insurance Committee

IT IS a pleasure to announce that through the cooperation of your officers our entire membership can now secure protection against loss of income due to sickness or accident under a Group Plan of Insurance never before available to us as individuals.

The most valuable asset of a chiropodist—from an economic viewpoint—is his ability to be in his office day in and day out. To the professional man the effects of loss of time through unforeseen disability are felt immediately. Therefore, there is a vital need for replacement of that income. Of course, many of us have individual disability policies. They can be purchased at full manual rates if one can pass the stringent physical requirements. Now, through the concerted action of our large membership, the advantages of much broader coverage at considerably lower cost can be obtained through a Group Plan.

At our annual convention three years ago the House of Delegates adopted such a plan designed especially for the National Association of Chiropodists and underwritten by the United States Life Insurance Company in the City of New York. Until now enrollment has been by states and several hundred chiropodists are already enjoying the benefits of this insurance. The demand has become so great from all sections of the country that we have prevailed upon the United States Life Insurance Company to make it immediately available to everyone regardless of location.

Our Plan is unique in that it embraces the entire National Association and we thereby gain the benefit of a much larger group than is ordinarily possible. For this reason it is particularly important to each one of us that the Plan have your full support. The success of this cooperative action will be directly in proportion to the promptness with which we respond.

You will all receive a booklet describing the Plan in detail together with an enrollment card and return envelope. This should be completed and returned along with a check covering the first premium to the office of the National Association of Chiropodists. Policies will be issued promptly to those who qualify and as soon thereafter as the majority in each local group has enrolled, everyone will be accepted regardless of past or present medical history. These benefits must necessarily be limited to members of the National Association. Non-members who make application for membership promptly will become eligible for this insurance.

Your Association is proud of this project and we trust that your response will be enthusiastic. We urge that you mail in your enrollment promptly so that all of us can secure the full benefits now available.

URGE NON-MEMBERS
TO JOIN THE N. A. C.

DELAWARE CHIROPODISTS RECOGNIZED BY STATE INDUSTRIAL ACCIDENT BOARD

THE following official communication from the Industrial Accident Board of the State of Delaware was directed to Dr. L. A. Walsh, Chairman of the N.A.C. Industrial Foot Health Committee:

State of Delaware
Industrial Accident Board
Wilmington 7, Delaware
May 13, 1947

Dr. L. A. Walsh
246 Delaware Trust Bldg.
Wilmington, Delaware

Dear Dr. Walsh:

We quote from the minutes of meeting of the Industrial Accident Board of April 10, 1947: "The Members of the Industrial Accident Board concurred in agreeing that a chiropodist can be termed a physician within the legal scope of chiropody and may be employed and appear before the Industrial Accident Board in treatment of cases on the lower extremities."

Very truly yours,

INDUSTRIAL ACCIDENT BOARD
Francis D. Buck (signed)
Secretary

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MILITARY ASSOCIATION OF CHIROPODISTS

BY-LAWS (Continued)

Art. VI. Duties of Officers.

Section 1 — The President when present shall preside at all meetings of the Association. He shall consult with the members of the Advisory Board as deemed necessary for the conduct of the business of the Association. He shall appoint all committees, approve all proper bills, and perform such other duties as are incumbent upon such an officer under the accepted rules of parliamentary procedure.

Section 2 — The Vice-Presidents in order of seniority shall perform the duties of the President in the absence or inability of that officer.

Section 3 — The Secretary shall keep the minutes of the meetings, the records and archives of the Association; receive all applications for membership and refer them to the annual meeting for action thereon; issue certificates of membership to Honorary Members on election, and to active members when elected to membership; and shall hold office until his tenure is terminated by resignation, or death, or by the election of his successor.

He shall be editor of the official publication of the Association.

He may appoint an Assistant Secretary each year with the approval of the President.

He shall receive all moneys due the Association, collect all assessments, and pay all bills which have been properly approved.

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3. *Its use as a wet dressing is frequently indicated. If the toes are affected,* a thin layer of cotton, moist with the medication, must be left on, between, and under them on the morning application, to be held in place by the hose during the day.

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The accounts of the Secretary shall be audited by a certified public accountant, so selected by the President. Auditing shall take place as soon as possible after the end of the fiscal year, and at such other times as he may be directed by the President or the Advisory Board.

The Secretary in this report shall show the number of active members in good standing, the number of Honorary Members, the number of active members deceased, resigned or dropped under Article II of the By-Laws.

Art. VII. Standing Committees.

Section 1 — The Publication Committee shall assist the Secretary in the procurement of papers and other literary material for the Association's publication, and shall advise him as to its policies and management.

Section 2 — The Committee on Arrangements shall under the instructions they may receive from the President, make all local arrangements for the annual meetings of the Association.

Section 3 — The Nominating Committee shall at the annual meeting, present a list of candidates for the several offices for the ensuing year.

After the report of the Committee is made and before it is put to a vote, the chair shall give opportunity for nominations from the floor.

Art. VIII. Amendments.

All proposed amendments to these By-Laws must be forwarded to the Secretary, who will present them to the annual meeting for action. All amendments must have a two-thirds vote to become adopted. All amendments must be sent to the Secretary, who shall cause same to be pub-

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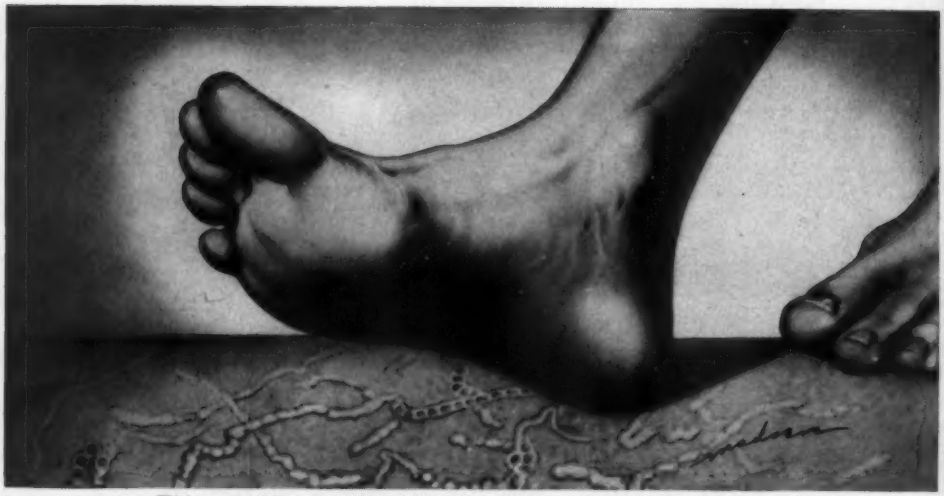

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lished to the membership at large, at least sixty (60) days prior to the annual meeting.

Art. IX.

Unless otherwise stipulated, Robert's Rules of Order shall pertain and be the governing code for this organization at the annual meeting or other meetings of the organization.

(Note: This is the final section of the Constitution and By-Laws of the M. A. C.)

THE MEANING OF NORMAL

IN MEDICINE and the medical sciences the word "normal" is in constant use but, as a rule, without a proper clarification of its meaning.

For every organ and tissue, and in respect both of its structure and its function, there is a natural range of variability in any population studied and in the species as a whole. Within this range efficient performance and adaptation to common stresses may be recognized. The "normal," in biology and medicine, is better expressed in terms of this variability than as a hypothetical mean or standard.

The study of human variability within the normal range is important (1) as a fundamental biological study; (2) as supplying necessary standards in medicine for the recognition of health and sickness and borderline states; and (3) because the extremes within the normal range of variability in respect to certain functions may help to explain certain

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innate resistances and predispositions to disease and to place the study of diathesis on a firmer footing.

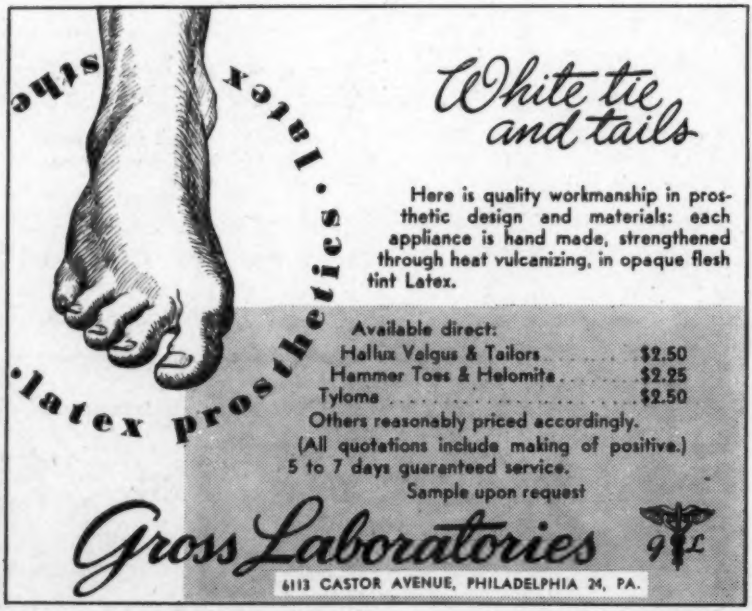
The term health ("wholeness"), as affecting the individual, should embrace (besides those of sensory well-being and structural integrity) ideas of balance and adaptability; these in turn reflect the functioning within its normal range.

Health and disease know no sharp boundary. They could only do so if it were possible for biology to adopt the dictionary definition of normality. But variability, both in time and in the species, is one of the most distinctive and necessary attributes of life which thus admits no constant and no norm.

John A. Ryle
Lancet 6436 (Jan. 4, 1947)

APPLICATIONS FOR EXHIBIT SPACE AT 35TH ANNUAL CONVENTION NOW BEING ACCEPTED

APPLICATIONS for commercial exhibit space during the N. A. C. Convention, August 21-26, 1947, which is being held in the Civic Auditorium, Grand Rapids, Michigan, are now being accepted. Firms or individuals interested, or members who wish to suggest prospective exhibitors, are requested to write: Dr. Wm. J. Stickel, Convention Director, 3500 14th St., N.W., Washington 10, D. C.



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THE TREATMENT OF PAINFUL FEET

ROBERT P. MONTGOMERY, M.D.

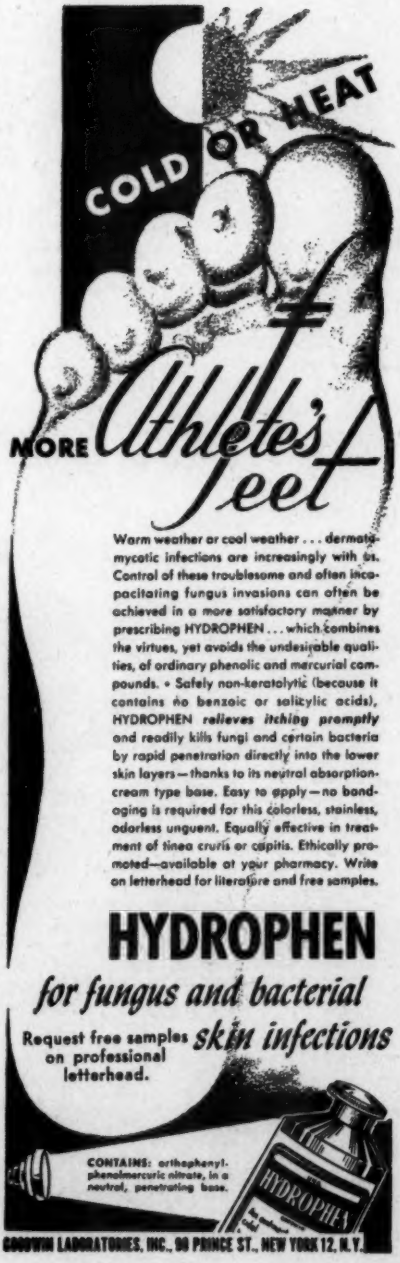
FOOT STRAIN is most commonly brought about by fatigue, which may attend obesity, rapid growth, overwork, chronic infections and convalescence. Tiring of the muscles of the legs lessens the support of the arches, and the ligaments which arch the bones of the foot are subjected to increaseed strain and become stretched, permitting the arches to flatten, whereafter the subject "turns out" his feet when walking, with the result that abnormal pressure is placed on the balls of the feet, and this gives rise to the development of corns and calluses.

Treatment is directed toward the correction of these causes, and this is accomplished by the establishment of a normal heel-toe gait with the feet pointed straight forward. Adhesive straps, shoe pads and shaping of shoes may be necessary to this end. As the feet approach normal positions the corns and calluses disappear.

Rigid arch supports give palliative relief, but by doing the work of the muscles and preventing muscular exercise they actually further weaken the arch muscles. Their use is rarely indicated in children's shoes; the muscles should be developed by exercises in correct walking.

Normal use of the foot is permitted by a flexible shank shoe. High-heeled women's shoes must be rigid-shanked, and lead to foot strain; hence the greater incidence of foot disorders in women.

Pain in the feet and legs may be relieved by alternately placing them 1 to 2 minutes in warm water and then elevating them above the water, the feet dorsiflexed and the soles of the feet turned toward each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other. Repeat this procedure 5 to 10 times.

Surgery, manipulation under anesthesia or the application of cases is rarely required in these cases.

Abstracted from The Wisconsin Medical Journal 42-787:43.

FLUORESCENCE OF NAILS

To the Editor: It has been reported (Ginsberg, Julius E., and Shallenberger, Paul L.: Wood's Light Fluorescence Phenomenon in Quinacrine Medication (The Journal, July 6, 1946, p. 808) that following discontinuance of quinacrine therapy the characteristic greenish yellow fluorescence exhibited by the nails beneath Wood's light disappears last from the nail of the great toe. Can this be explained on the basis of differential rates of growth of the various toenails, or is an additional factor involved?

W. Q. Wolfson, M.D., Chicago.

Answer—The explanation of this phenomenon is believed to be on the basis of the different rates of growth of the different nails. The fluorescence appears to disappear from the proximal portion of the nail within a month or two after the quinacrine is stopped. As time goes on this clear proximal portion becomes greater and gradually results in a fading distal fluorescence. It is felt that if absorption of quinacrine from the nail had occurred, the fading process would have in-

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volved the entire nail instead of having its origin and end result as reported.

It seems to have been established in human beings that there is some gradation of growth rate in the various nails of the body and that the great toe, being the largest nail and usually the thickest, probably has the slowest rate of growth. In addition to the foregoing comments, the inquirer may be interested in referring to a previous article on this subject entitled "Unusual Pigmentation Developing After Prolonged Suppressive Therapy with Quinacrine Hydrochloride," by Lutterloh and Shallenberger (*Arch. Dermat. & Syph.* 53:349 [April] 1946). In this study the deposits of quinacrine were observed to remain in relatively the same spot where they originally occurred. The interpretation of this was that the pigment had been deposited in the nail bed rather than in the nail itself. It was accordingly believed that the fluorescence is a phenomenon of diffuse drug distribution while the pigmentation is most likely a result of periodicity and irregularity in the amounts of drug dosage. In other words, the fluctuation of the drug dosage of from one to ten tablets a day would result in widely different heights of blood level, saturation and resultant pigment deposit.

J.A.M.A. April 19, 1947.

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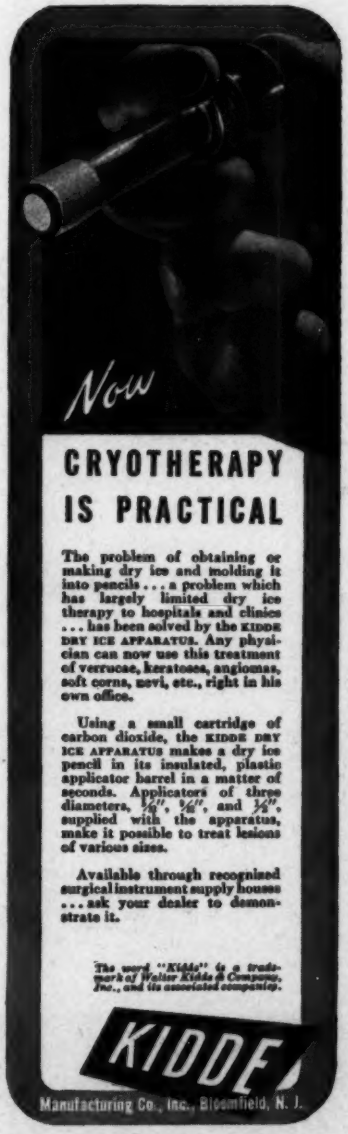
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REFERENCE DIGEST

A condensation of articles relating to the lower extremities.

DR. ROBERT B. RAKOW
Brooklyn, N. Y.

Treatment of Mycotic Infections by Inhibiting Respiration of Dermatophytes: Captain F. A. Dolce, Lieutenant W. J. Nickerson, M. C., A. U. S., Archives of Dermatology and Syphilology, March, 1947.

The multitude of preparations that are at present being used for the treatment of mycotic infections is testimony to the chaotic state the therapy of this common disorder is in. The medical basis for the use of many of the common preparations is quite obscure.

The authors have attempted, from a physiological aspect, to study the effects of a medication that would inhibit the respiration and thereby the metabolism of the dermatophytes. In vitro studies have shown that chloride salt of zinc can inhibit the respiration of the dermatophytes studied. Clinical trials were, therefore, in order. While the results after the use of zinc chloride in tinea cruris and tinea glabrosa deserved continued investigation, the results in tinea pedis were unsatisfactory.

Dolce and Nickerson treated a group of forty-five (45) soldiers with superficial fungus infections. The diagnosis was confirmed by laboratory studies. A one (1) percent alcoholic solution of zinc chloride was the preparation under surveillance. The patients continued their duties and applied the medication once a day for an average of twenty days.

No cases of tinea pedis were cured by this method. Twenty-nine (29) percent of the acute mycotic infections were complicated by the appearance of "id" lesions lymphangitis and cellulitis after the use of the zinc chloride tincture.

Because of the poor clinical results following the use of this compound, and further, because in vitro investigation demonstrated the respiratory-inhibitory action of the combination of 0.25 percent carbolic acid and 2 percent salicylic acid, in 1 percent tincture of zinc chloride, this new preparation was employed. No definite conclusions could be drawn due to the paucity of clinical trials.

It is important to understand that the authors merely have introduced a new approach to the treatment of dermatophytosis. The cure for this common skin disease must be the result of sound, basic reasoning derived from accepted medical principles.

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STATE SOCIETY AND ORGANIZATION NEWS

NOTICE TO SECRETARIES AND TREASURERS OF AFFILIATED STATE SOCIETIES

Payment of N.A.C. Dues and Apportionment of Delegates

N.A.C. DUES for the fiscal year 1947-48 were due on June 1, 1947. Apportionment of the number of delegates for each state is based on the number of paid up members in the period from June 1, 1947 to August 20, 1947.

William J. Stickel
Executive Secretary

DISTRICT OF COLUMBIA

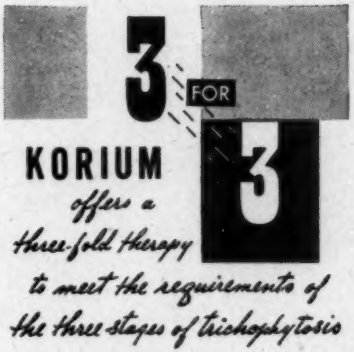
THE District of Columbia Podiatry Society recently elected the following officers: President, Dr. Dion W. Meeks; President-Elect, Dr. M. Sitzer; Vice President, Dr. E. J. Love; Secretary-Treasurer, Dr. Philip D. Sussan; N.A.C. Councilman, Dr. J. Fischgrund; Executive Board, Dr. C. F. Conrad.

V. A. HOSPITAL APPOINTMENT

DR. EDWARD J. O'BRIEN, 1456 Massachusetts Avenue, Cambridge, Mass., has been appointed to the staff of the Veterans Hospital in Bedford, Mass. This facility specializes in the care of neuropsychiatric patients.

ALUMNI OF CHICAGO COLLEGE WILL MEET IN GRAND RAPIDS

THE Alumni Association of the Chicago College of Chiropody will hold its annual meeting during the N.A.C. convention in Grand Rapids next August. All members are requested to attend.



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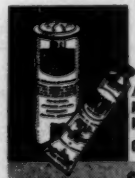

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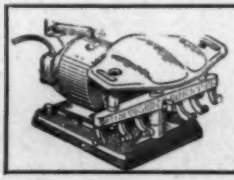
VIRGINIA

THE Virginia Pedic Association held its semi-annual convention in conjunction with the Mid-Atlantic Association of Chiropodists annual convention at the Hotel John Marshall in Richmond, Virginia, on May 17-18, 1947. The following scientific program was presented:

Dr. Alex Levin, surgeon chiropodist on the staff of Doctors Hospital, Washington, D. C., lectured on "Clinical Diagnosis in Podiatrical Surgery"; Nathan Bloom, M.D., Professor of Medicine, Medical College of Virginia, Richmond, Virginia, lectured on the "Diagnosis and Management of Peripheral Vascular Diseases"; Dr. Harry W. Weinerman, Brooklyn, N. Y., lectured on "New Approach to Foot Imbalance"; Dr. Jack Applebaum of New York lectured on "Physical Therapy in Chiropody."

These lectures were followed by a series of scientific films. Dr. Albert Pincus of Richmond served as convention chairman.



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MINNESOTA

THE 34th annual convention of the Minnesota Association of Chiropodists was held in Duluth on May 3-4, 1947. The following speakers appeared on the scientific program: Drs. Thomas Nichols, Martin O. Wallace, and Walter R. Bartig. Judge Mark Nolan was the speaker at the banquet.

The following officers were elected: President, Dr. H. A. Field; Executive Vice President, Dr. W. W. Goldsworthy; First Vice President, Dr. L. W. Schmiege; Second Vice President, Dr. Robert Ray; Secretary-Treasurer, Dr. Maurice Lapiere; Recording Secretary, Dr. Althea Nelson; Sergeant-at-Arms, Dr. George Nelson; Insurance Secretary, Dr. Robert Ray; N.A.C. Delegate, Dr. H. Leibold; N.A.C. Alternate, Dr. W. Bartig; N.A.C. Councilman, Dr. I. W. Baumgaertner.

Dr. Evadne Norris of Iowa, now practicing in Duluth, was elected to membership. St. Paul was selected for the 1948 convention city.

MINNESOTA WOMEN'S AUXILIARY MEETS IN DULUTH

THE Minnesota Women's Auxiliary held its annual meeting in Duluth May 2-3, 1947. Three new members were enrolled, bringing the total membership to twenty-four.

The following officers were re-elected: President, Mrs. H. Leibold; Vice President, Mrs. Raymond Shaw; Secretary, Mrs. George Nelson; Treasurer, Mrs. Harry Field; Sergeant - at - Arms, Mrs. Henry Kaldahl.

The group has been engaged in distributing the monograph "Chiropody As a Career" to high schools and libraries throughout Minnesota. An extensive public relations program is planned for the coming year.

MASSACHUSETTS

AT THE May meeting of the Massachusetts Chiropody Association, the following officers were elected: President, Dr. Joseph Guy; First Vice President, Dr. Arthur McGrady; Second Vice President, Dr. Warren Spear; Treasurer, Dr. Sidney G. Holmes; Secretary, Dr. Arnold S. Singer; N.A.C. Councilman, Dr. William D. Cogan; Members, Board of Directors: Drs. Harvey Atkinson, Hugh Gallagher, Vincent Guy, Mal Humphrey, John Kelly and A. Kizelewicz; N.A.C. Delegates, Drs. Harvey Atkinson, Arthur McGrady and Sidney G. Holmes.

PENNSYLVANIA

Northwestern Division

THE Northwestern Division of the Chiropody Society of Pennsylvania held a meeting April 27, 1947, at the Lawrence Hotel in Erie. Dr. P. R. Brachman of Chicago presented a symposium and clinic on advanced mechanical therapy.

North Philadelphia Division

THE regular meeting of the North Philadelphia Division of the Chiropody Society of Pennsylvania was held on May 13, 1947, at the Hotel Essex, Philadelphia. The following officers were elected for the coming year: Chairman, Dr. Firth; Secretary, Dr. Benz; Treasurer, Dr. Engel.

ARIZONA

AT THE April meeting of the Arizona Chiropody Association the following officers were elected: President, Dr. W. H. Austin; Vice President, Dr. E. C. Badger, Sec.-Treasurer, Dr. Harold S. Mitton.

RHODE ISLAND

A REGULAR meeting of the Rhode Island Chiropodists Society was held at the Sheraton-Biltmore Hotel on May 21, 1947, in Provi-

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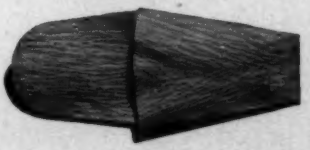

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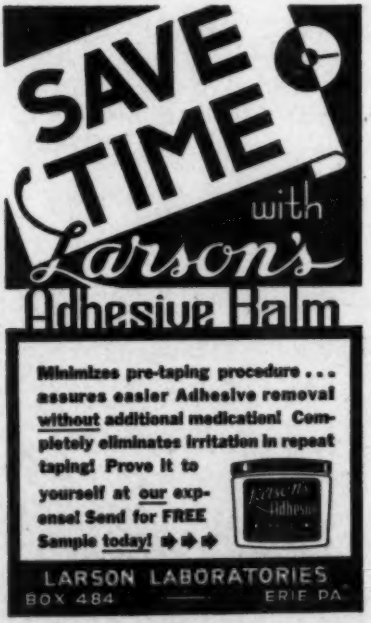
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dence. The following officers were elected: President, Dr. G. G. Feinberg; Vice President, Dr. A. C. Moran; Secretary, Dr. A. L. Hubby; Treasurer, Dr. M. Keller; N.A.C. Delegate, Dr. H. I. Goldman; N.A.C. Councilman, Dr. A. L. Hubby.

The following were elected to the Board of Directors: Drs. B. Shaffer, J. Hamilton, H. Johnson, S. Kouffman, J. McGauran.

ILLINOIS

THE Sangamon County Chiropody Association held a regular meeting on May 13, 1947, in Springfield, Ill. The speaker was Dr. Albert Philip Ludin, psychiatrist, who spoke on "Neuropsychiatry." Dr. Paul Mahaffey was program chairman. The June meeting was held June 10, 1947, at the Illinois Hotel in Springfield and the guest speaker was Dr. Kenneth Schnepp, who gave an illustrated lecture on the surgical treatment of varicose veins. Dr. Siebert introduced the speaker.

OHIO

DR. E. MARTIN PAUL of Cleveland was presented with the "Man of the Year" award by the Ohio Chiropodists Association for his outstanding work in the field of public relations. The award was made at the annual convention of the Ohio Association held May 3-5, 1947, at the Mayflower Hotel in Akron. The following officers were elected: President, Dr. G. E. Gardner; President-Elect, Dr. T. Crotty; Vice President, Dr. D. L. Jones; Secretary-Treasurer, Dr. C. P. Beach; N.A.C. Delegates, Drs. D. W. Myers, J. E. Titus and N. C. MacBane.

The following speakers appeared on the scientific program: Dr. John T. Sharp of Philadelphia, Dr. H. L. Du Vries of Chicago, Dr. O. E. Berger of Chicago, and Dr. Fred Arst of Wichita.

The Buckeye Chapter of the Mil-

itary Association of Chiropodists held its annual meeting during the convention and elected the following officers:

President, Dr. E. G. Griffith; Vice President, Dr. R. Prochaska; Sec.-Treasurer, W. M. Finnerty.

The Association will hold its 1948 convention in Cincinnati. Past president J. E. Titus was given a vote of thanks for his excellent leadership. Life membership was conferred on Drs. N. A. Beach, C. P. Beach, and A. J. Thorman. Memorial resolutions for Drs. H. C. Stahl and B. Brill were adopted.

OHIO WOMEN'S AUXILIARY ELECTS OFFICERS

THE Ohio Women's Auxiliary elected the following officers at the annual meeting held in Akron, May 3-5, 1947: President, Mrs. Floyd Frost; Vice President, Mrs. A. J. Wish; Treasurer, Mrs. H. B. O'Grady; Secretary, Mrs. H. B. Neer; Corresponding Secretary, Mrs. C. J. Motto.

The following zone chairmen were appointed: Mrs. Neil C. MacBane, Mrs. N. J. Yarnell, Mrs. Clifford Wyek and Mrs. J. T. Brightwell.

Membership chairman is Mrs. D. L. Jones and publicity chairman Mrs. Henry Dennis. The national delegate is Mrs. Floyd Frost and the alternate, Mrs. Jesse Titus.

OREGON

THE Oregon State Association of Chiropodists at a regular meeting held May 21, 1947, in Portland elected Dr. Walter Hay, Vice President and Dr. Earle P. Delaney, Secretary-Treasurer. The election was made necessary due to the resignation of the former secretary.

Dr. K. Garvin discussed the disadvantages in certain types of liability insurance. Dr. Delaney was assigned to investigate the insurance programs of the medical and dental societies in the State. Dr.

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Earl Des Champs discussed the present definition in the Oregon Chiropody Practice Act. Dr. A. M. Depner proposed contacting the Industrial Accident Commission in an effort to secure their cooperation with the profession.

F. A. A. C. MEETING HELD

Approximately 150 members attended the recent annual meeting of the American Academy of Chiropodists in Cleveland, Ohio. They paid their respects to Dr. Harlow Stahl by attending the "Stahl Day of Lectures."

Six new members were presented with certificates: Dr. T. E. Ingersoll, Mich.; Dr. V. A. Jablon, Conn.; Dr. T. Hunter, Ohio; Dr. R. Sansone, Conn.; Dr. N. Foote, Canada; Dr. C. E. Mensing, Ill.

Dr. J. J. Jones of Warren, Ohio, was elected to the office of Trustee.

DEATHS REPORTED

Dr. Cordelia B. Knowles
Cleveland, Ohio
Dr. N. W. Herrick
San Diego, California
Dr. Meredith Gober
Muskagee, Oklahoma

Dr. Cordelia B. Knowles passed away May 23, 1947. She had practiced chiropody in Cleveland, Ohio, for more than forty years. Dr. Knowles had served as a Vice President of the National Association of Chiropodists, which she helped to organize in 1912. Most members of the profession knew her as "Mother" Knowles. She is survived by seven sons: Dr. Herbert M., Cleveland chiropodist and minister of Broadway Christian Church; Rev. Louis G., pastor of Highland Christian Church; Errett W., Bedford; A. Gerould, Niles, Ohio; Ralph C., Columbus; Almon B., New Orleans, and Harry B., formerly of Salem, Oregon, now of Independence, Oregon. Also surviving her are 18 grandchildren and 15 great-grandchildren.

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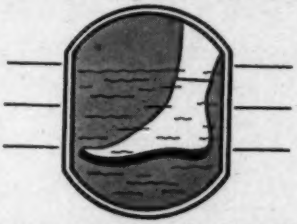

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MISSOURI ASSOCIATION OF CHIROPODISTS
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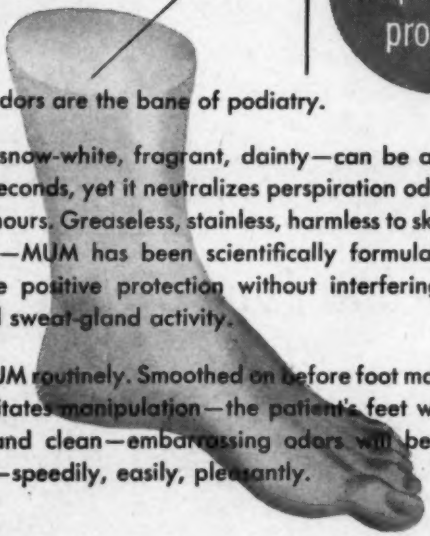

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